

Frequently Asked Questions

Stormwater Design for Developments

Information Requirements

Where can I find information on the City of Ballarat's engineering requirements?

The City of Ballarat uses the latest [Infrastructure Design Manual \(IDM\)](#), which outlines our engineering / infrastructure standards for roads, drainage, and other structures. The manual is used to make sure minimum design criteria are met for design and construction of infrastructure, whether it is constructed by City of Ballarat or a developer.

In the absence of specific information in the IDM, checklists, or standard specifications, the City of Ballarat will expect the relevant standard or authority requirements to be applied. The IDM does refer to material such as Austroads, VicRoads, Australian Rainfall and Runoff etc. for further information.

Which standard drawings does the City of Ballarat use?

There are two types of standard drawings used in Ballarat, [Infrastructure Design Manual \(IDM\)](#) standard drawings and the [City of Ballarat's standard infrastructure drawings](#). In most new development sites, the IDM standard drawings will be the drawing set used for infrastructure. For development in existing urban areas, the IDM takes priority over the standard infrastructure drawings, unless existing City of Ballarat infrastructure prevents the use of the IDM standards.

What information is required when submitting engineering plans for approval?

Engineering information requirements are outlined in the [Infrastructure Design Manual \(IDM\)](#). In addition to any specific requirements set out in the Planning Permit conditions, it is expected that development demonstrates that the plans and computations submitted comply with the technical provisions set out in the relevant clauses of the IDM.

The detailed checklists appended to the IDM provide designers with documentation templates to demonstrate that the requirements have been satisfied. Designers are expected to sign the relevant checklists to verify that the specified criteria have been met and submit them with plans as supporting information.

Does the City of Ballarat have drainage asset information available?

It is recommended that designers first complete a [Before You Dig Australia \(BYDA\)](#) information request. It is acknowledged that in some areas, not all drainage assets are represented on this system due to data updates currently being processed or no data is available.

If the BYDA information indicates drainage assets are present in the area or site investigations confirm drainage assets exist and you need more information pertaining to layout, type, size, levels, depth etc. a request for this information can be sent to engineering@ballarat.vic.gov.au along with the BYDA information, response and site investigations. A response to this information request is estimated to take up to four (4) weeks.

Does the City of Ballarat have drainage easement information available?

While some information does exist on subdivision plans and represented on maps, this is not always complete or detailed enough to confirm the extent of easement, type, and which land it relates to (not all drainage easements are in favor of the City of Ballarat). This information is available from [Landata](#), noting you can obtain information for the development site and other land which may be impacted.

Urban Drainage

What is the storm event that drainage infrastructure is to be designed for?

The design of the minor drainage system to be based on the AEPs shown in Table 9 of the [Infrastructure Design Manual \(IDM\)](#). The City of Ballarat will expect the design will identify all overland flow pathways to be activated in 1% AEP events, and to demonstrate that these pathways have sufficient capacity to convey all excess runoff once the available capacity of the minor drainage system has been fully mobilised.

What are the pre- and post-development coefficient of run-off to be used?

The minimum runoff coefficients to be used in the design of drainage systems are shown in Table 9 of the [Infrastructure Design Manual \(IDM\)](#).

What drainage computations are required to be submitted with drainage plans?

It is expected that the design is to include a catchment plan showing the total catchment area and sub-areas that form the basis of the design, and to submit this for approval, together with a drainage computations sheet. Computations should demonstrate that the:

- hydrology, rainfall data, runoff coefficients, and hydraulic design parameters used are in accordance with the relevant requirements and adjusted to reflect the site and development proposed.
- required minimum flow velocities have been achieved, and the pipe capacities are adequate for the intended purpose.
- permissible rate of discharge and the volume of on-site detention required have been determined and show that the existing drainage system will not be adversely impacted by the development.
- development works necessary are designed to minimise the impact on the existing drainage network; and
- major drainage systems have sufficient capacity to collect the excess runoff from a catchment in a 1% AEP rainfall event once the available capacity of the minor drainage system has been fully mobilised, and to convey that runoff to the receiving waters with minimal nuisance, danger, or damage.

On-Site Detention Systems

How do I confirm the permissible site discharge (PSD) for the development?

Permissible site discharge (PSD) is intended to be based on the actual network design capacity rather than the peak discharge prior to development. Acceptable methods to determine the PSD are outlined in the [Infrastructure Design Manual \(IDM\)](#) and include:

- Where the site and the upstream catchment are relatively small in extent and uniform in character (developments up to ~5ha in area, and upstream catchments to ~50ha in area), the Rational Method should be used to calculate a site PSD based on the rainfall intensity at the design storm event / recurrence interval and the time of concentration (T_C) for the upstream catchment.
- The preferred approach is to use the Swinburne Method, which considers the site within a catchment. This requires the peak flow time of concentration to the development site (T_{CS}) compared with the total time of concentration for the catchment (T_C) to calculate the PSD on associated with the design storm event.

If a planning permit does not specify either the PSD or T_C / T_{CS} , it is required that a request for this information be sent to engineering@ballarat.vic.gov.au. A response to this information request is estimated to take up to four (4) weeks.

If the information requested is not available or is not able to be accurately determined, then the design is to estimate the T_C for the relevant catchment and from the top of the catchment to the development site using recognised methods.

How do I calculate the on-site detention system storage volume?

For developments up to ~5ha in area, and upstream catchments to ~50ha in area the required storage is taken to be equal to the difference between the overall volumes flowing into storage device (post-development) and permissible flows out of the storage device (PSD) from the start of the event until the discharge entering the storage device (after reaching and passing the peak value) decreases to the PSD. Calculations should be based on the following parameters:

- The original design event should be assumed to have been based on a 1EY (1-year) event.
- Annual exceedance probability for the current design event refer to Section 16.6 of the [Infrastructure Design Manual \(IDM\)](#)
- Coefficients of runoff refer to Section 16.7 of the IDM

Can I use the IDM Table 13 Storage Volumes and Discharge Rates?

For residential, industrial, or commercial developments where the total site area does not exceed ~1ha, and where the PSD or T_C to enable PSD to be calculated has not been specified by The City of Ballarat the [Infrastructure Design Manual \(IDM\)](#) Table 13 provides guidance on the allowable discharge rates and storage volumes for the most common types of small developments.

If a planning permit does not specify either the PSD or T_C , it is required that a request for this information be sent to engineering@ballarat.vic.gov.au. A response to this information request is estimated to take up to four (4) weeks.

If the information requested is not available or is not able to be accurately determined, then the allowable discharge rates for small developments can be adopted from IDM Table 13 which are based on a T_C of 20 minutes.

What on-site detention solutions are acceptable for small development?

The most commonly acceptable systems are as follows:

- Conventional rainwater storage tanks.
- Driveways bounded by kerbs of not less than 100 mm in width.
- Underground pipes and tanks of various configurations.
- Underground pipes and tanks with pumped outfalls.
- Lined, in-ground storage basins with pumped outfalls.
- Excavated earthen dams with gravity outfalls (in low-density residential Developments).

Typical outflow control arrangements are for gravity drawdown to take place through a pipe (with no provision to vary the flow capacity), an orifice plate, or a proprietary multi-cell unit. When a site is located below street level, and no network drainage is available along the rear boundary, pumping may become the only viable option.

Stormwater Treatment

Is WSUD required for the whole development or just new dwellings / lots?

The City of Ballarat will expect all developments to make provision for the improvement of water quality leaving the development by works located close to the nominated point of discharge for the development. This can be achieved by retrofitting existing development, providing for new development or a combination of both.

Aside from the Ballarat Planning Scheme requirements, developments should comply with the principles and recommendations of [Water Sensitive Urban Design Guidelines](#), [Urban Stormwater – Best Practice Environmental Management Guidelines](#), [Urban Stormwater Management Guidance](#), the [City of Ballarat's Stormwater Management Plan](#) and Precinct Structure Plans to achieve the following minimum water quality standards:

- 80% retention of the typical urban annual load for Total Suspended Solids (TSS).
- 45% retention of the typical urban annual load for Total Phosphorus (TP).
- 45% retention of the typical urban annual load for Total Nitrogen (TN).
- 70% retention of the typical urban annual load for gross pollutants (litter).
- Maintain discharges for the 1.5 ARI at pre-development levels.

What WSUD solutions are acceptable for small development?

The stormwater treatment methods are generally considered to include:

- Bioretention swales.
- Bioretention basins.
- Vegetated swales.
- Underground sand filters.
- Sedimentation basins.
- Constructed wetlands.
- Pond system with edge vegetation.
- Water tanks.
- Gross pollutant traps.
- Litter traps.

[Melbourne Water's developer guides and resources](#) should be referenced for WSUD treatments and design selection to develop appropriate strategies for addressing requirements. Proprietary products can be considered as private assets subject demonstrating appropriate use, type, sizing, and performance specifications of the product.

Do I need to provide a MUSIC model or Melbourne Water Storm Report?

A model is usually needed during the design of stormwater treatments to help determine the appropriate size and design configuration and demonstrate that it meets minimum planning requirements. The [STORM calculator](#) can be used to model stormwater treatments for small subdivisions, while the [Model for Urban Stormwater Improvement Conceptualisation \(MUSIC\)](#) is used for more complex projects.

Stormwater Discharge Points

Where is the Legal Point of Discharge (LPoD)?

If a planning permit does not specify the LPoD, to establish the correct point, a copy of your Certificate of Title and a site plan showing the nature and location of the proposed works must be supplied with a [Property Information Request form](#) and submitted to our [Customer Service team](#). It is recommended that this request is actioned prior to and included with a planning permit application.

The LPoD location is too high for a gravity solution?

Small pumped systems are an acceptable solution, serving catchments up to 2,000m² in areas where stormwater cannot be conveyed by gravity to a LPoD. These systems are to be designed to comply with the IDM and Section 9 of AS/NZS 3500.3.